

LICENSE AGREEMENT
BETWEEN
ADVANCED OPTICAL TECHNOLOGIES, L.L.C.
AND
FINELITE, INC.

This License Agreement ("Agreement") is made as of June 8, 2001 (the "Effective Date") between Advanced Optical Technologies, L.L.C. ("AOT"), a Delaware limited liability company with its principal place of business at 8301 Greensboro Drive, Suite 110, McLean, Virginia 22102 or its assigns, and Finelite, Inc. ("FINELITE"), a California corporation with its principal place of business at 30300 Whipple Road, Union City, CA 94587.

WHEREAS, AOT has developed or otherwise obtained rights with respect to various proprietary optical technologies; and

WHEREAS, FINELITE wishes to obtain a license under AOT's Proprietary Rights to make, use and sell low profile fluorescent (LPF) fixtures utilizing fluorescent light sources for commercial, educational, retail, and industrial lighting applications; and

WHEREAS, AOT is willing to grant such license in accordance with the terms and conditions hereof;

NOW, THEREFORE, for and in consideration of the foregoing, of the mutual covenants and undertakings contained herein and of other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties, intending to be legally bound, hereby agree as follows:

1. Definitions

1.1 "AOT Improvements" means any improvements made by FINELITE to AOT's proprietary optical technologies, including the patent, trade secret and other proprietary rights associated therewith.

1.2 "AOT's Proprietary Rights" means the patent, trade secret and other proprietary rights associated with the concept of Constructive Occlusion owned by AOT at any time during the term of this Agreement that cover the manufacture, use, or sale of Units.

1.3 "Commercialization Date" means the earlier of (i) the first date that Units are offered for sale by FINELITE, or (ii) June 1, 2002.

1.4 "Constructive Occlusion" means the use of certain optical components, including a mask and a cavity, in apparatus for projecting electromagnetic radiation with a tailored intensity distribution.

1.5 "Gross Receipts" with respect to Units means the total of the gross amount billed or invoiced on the first sale or other disposition of the Units by FINELITE or its subsidiaries to third parties, where the "gross amount billed or invoiced" for calculating such Gross Receipts means: (i) if the Units are sold to a third party other than a Special Party, FINELITE's actual billing or invoice amount for such Units, minus shipping and commissions; (ii) if the Units are sold to a Special Party for subsequent resale by or for such Special Party, the greater of FINELITE's actual billing or invoice amount or the Special Party's invoice amount for such Units; or (iii) if the Units are sold to a Special Party for use by such Special Party, the billing or invoice amount that would have resulted from a hypothetical arm's-length sale by FINELITE to a third party if such third party were not a Special Party.

1.6 "Design Proprietary Rights" means the patent, trade secret and other proprietary rights in the Licensed Low profile fluorescent Design specifically.

1.7 "Licensed Low Profile Fluorescent Design" means AOT's proprietary design for an LPF fixture described in Appendix A, including future modifications.

1.8 "Special Party" means an affiliate of FINELITE or any other entity enjoying a special course of dealing with FINELITE or any of its affiliates, where such a "special course of dealing" includes co-marketing or other arrangements between a third party and FINELITE or one of its affiliates wherein such third party sells Units and FINELITE or its affiliate receives additional compensation based on the ultimate sale of Units, arrangements under which a third party sells Units under a private labeling arrangement with FINELITE or its affiliate, or barter arrangements in which FINELITE or its affiliate exchanges Units with a third party for another product or other products in-kind.

1.9 "Unit" means one LPF fixture utilizing a fluorescent light source(s) and conforming to the Licensed Low Profile Fluorescent Design.

2. Intellectual Property.

2.1 Subject to the terms and conditions hereof, AOT hereby grants to FINELITE, and FINELITE hereby accepts: (i) a worldwide, non-exclusive license under the Design Proprietary Rights to make, use and sell Units, and (ii) a worldwide, non-exclusive license under other AOT's Proprietary Rights to make, use and sell Units.

2.2 FINELITE acknowledges that the foregoing license does not extend to the manufacture, use or sale of any products other than Units.

2.3 AOT grants FINELITE no rights with respect to AOT's Proprietary Rights other than the limited license set forth in Section 2.1, and FINELITE shall take no action inconsistent with AOT's Proprietary Rights other than as expressly permitted hereunder. FINELITE hereby grants AOT a perpetual, nonexclusive, sublicensable license to use and disclose for any purpose any AOT Improvements and to make, use, import, offer for sale and sell products embodying AOT Improvements. Should AOT exercise this License, AOT shall pay FINELITE a royalty rate of 5% of any sublicensing royalties, or 5% of any other revenue that AOT receives from exploiting such AOT Improvements. Any and all royalty payments from AOT to FINELITE on AOT Improvements shall be governed by the same terms as those governing the royalty payments from FINELITE to AOT under this Agreement, as contained in Sections 3.2, 3.3, 3.4 and 3.6 herein. FINELITE shall have the right to terminate the license granted herein if AOT materially breaches any of its obligations under this Agreement, including by failing to make any payment as and when required by this Section, and AOT fails to remedy the breach within 30 days after receiving notice of the breach from FINELITE.

2.4 FINELITE shall be entitled to use, at FINELITE's discretion, the trademark CONSTRUCTIVE OCCLUSION (the "Mark") in connection with its sale of Units, including by using the Mark prominently in FINELITE's advertising materials, product packaging and instruction sheets or other package inserts, and by marking all Units with the Mark in a manner prominent to a person installing such Units (although not necessarily visible when the Units are installed). Subject to the terms and conditions hereof, AOT hereby grants to FINELITE, and FINELITE hereby accepts, a nonexclusive, worldwide, royalty-free license during the term of this Agreement to use the Mark to the extent required to perform the obligation set forth in the immediately preceding sentence. FINELITE may sublicense third parties to use the Mark only in connection with a sublicense permitted under Section 2.2, and only if such sublicensee agrees to be bound by all applicable obligations of FINELITE in this Section 2.6. FINELITE acknowledges that AOT owns all right, title and interest in and to the Mark, and agrees that all use of the Mark by FINELITE shall inure to the benefit of AOT. FINELITE shall do nothing inconsistent with AOT's ownership of the Mark, including applying to register the Mark or any variation thereof with any tribunal or other entity worldwide. Nothing in this Agreement shall give FINELITE any right, title or interest in the Mark other than the right to use the Mark in accordance with this Agreement. FINELITE shall use an appropriate notice of trademark rights in conjunction with the Mark in accordance with instructions provided by AOT. FINELITE shall cooperate in AOT's efforts to defend and protect the Mark and to maintain the Mark as a valid mark. All Units shall conform to reasonable standards of quality no less than those that FINELITE applies to its existing products as of the Effective Date, with which AOT is familiar. FINELITE shall inform AOT of such standards for Units on request, and FINELITE shall cooperate with AOT in permitting reasonable inspection of FINELITE's operations, and in supplying AOT with specimens of any planned use of the Mark by FINELITE for prior approval by AOT. Such approval shall be deemed automatically granted if AOT does not convey its disapproval to FINELITE in writing within 10 days after AOT's receipt of such specimens.

2.5 AOT hereby grants to FINELITE, and FINELITE hereby accepts a perpetual,

irrevocable right to purchase AOT's proprietary coating, AOT White 96™ at prevailing prices for the sole purpose of coating Unit's optical components.

3. Payments.

3.1 FINELITE shall pay AOT advance royalty payments of twenty thousand United States dollars (\$20,000) on the following basis:

\$5000 Go/No-Go Decision (Execution of License Agreement)
\$5000 Upon Completion of First Prototype
\$5000 Upon Completion of First Article Manufactured Unit
\$5000 Upon First Sale of a Unit

These payments shall be credited against future royalty payments.

3.2 In addition, FINELITE shall pay a royalty of 2% of Gross Receipts for each Unit sold or otherwise distributed by or for FINELITE on all product sales up to \$20,000,000 annually. FINELITE shall pay a royalty of 2.5% of Gross Receipts for each Unit sold or otherwise distributed by or for FINELITE on all product sales over \$20,000,000 annually. Notwithstanding the foregoing, the Parties agree that FINELITE shall not be responsible for any royalty payments under this Section for Units that are "otherwise disposed of" by means of warranty replacements, inventory overstock, as damaged Units, Units disposed of as scrap, and/or Units not otherwise "sold" or "distributed" by FINELITE, or any Special Parties pursuant to this Agreement.

insert

→ provided to agents or customers as "no charge" sales samples or

RC 6/19/01
RC 6/15/01

3.3 FINELITE shall pay such royalty on a calendar quarter basis. On or before the last day of each February, May, August and November for so long as royalties are payable under this Agreement, FINELITE shall pay the applicable royalty for each Unit sold during the preceding calendar quarter. With each such payment, FINELITE shall render to AOT a report in writing, setting forth by model the number of Units sold or otherwise distributed during the calendar quarter and the applicable royalty. FINELITE will provide additional reports as reasonably requested by AOT.

3.3 FINELITE also shall pay any sales, use, or excise taxes assessed as a result of payments made under this Agreement, but not taxes based on AOT's net income. All royalties payable under this Agreement shall be net of any applicable withholding taxes.

3.4 If FINELITE fails to make any payment required under this Agreement when due, FINELITE shall pay interest on such amount at the rate of one percent per month, which interest shall accrue from the date the payment is due until the date such payment is made in full.

3.5 Commencing on the Commercialization Date, if for any quarterly period, FINELITE does not pay royalties of at least five thousand United States dollars (\$5,000) under

Delete 3.5

RC 6/15/01
RC 6/19/01

delete 6/15/01 TC 6/19/01

Section 3.1, then FINELITE will pay an additional royalty equal to the difference between five thousand United States dollars (\$5,000) and the royalty paid under Section 3.1. AOT shall have the right to terminate this Agreement if FINELITE has not made such a payment within thirty (30) days of receiving notice of such deficiency. The minimum quarterly royalty payment will expire three (3) years after the Commercialization date.

3.6 FINELITE shall keep complete and accurate records and books of account containing all particulars and reasonable supporting documentation concerning all Units made and sold or otherwise distributed by or for FINELITE under this Agreement and the calculation of amounts payable under this Agreement. FINELITE shall retain such records and books for at least three (3) years after FINELITE pays AOT the applicable royalties. During such three (3) year period, within a reasonable time after receipt of notice from AOT, FINELITE shall allow a certified public accountant selected and paid for by AOT, and acceptable to FINELITE, which acceptance shall not be reasonably withheld, during business hours, on reasonable notice, no more often than annually, to examine any such records and books. If such records are insufficient for the foregoing purposes or any such inspection discloses an underpayment of royalties of five percent (5%) or more of the amount of royalties actually due for any quarterly period, then, in addition to any other rights and remedies available to AOT under this Agreement, including termination, FINELITE shall promptly pay the reasonable cost of such inspection after AOT's receipt of the bill or invoice for such inspection.

4. Commercialization.

4.1 FINELITE shall use its best efforts to (i) commence by June 1, 2002, and thereafter continue, an active and ongoing program of development of commercial Units and (ii) sell or otherwise distribute its first Unit by no later than June 1, 2002 and (iii) thereafter continue to maintain Units as an active product in its product line and actively market Units. If FINELITE fails to achieve any of the foregoing milestones, ~~even if FINELITE has used its best efforts to do so~~, AOT shall have the right to terminate this Agreement, including the license granted in Section 2.1, by written notice to FINELITE.

AOT shall have the right to review the commercialization program. If after such review, AOT demonstrates that Finelite has not made a good faith effort at commercialization, then

5. Representations and Warranties.

5.1 Each party represents and warrants to the other party that it has the right, power and authority to enter into and to perform its obligations under this Agreement.

5.2 AOT warrants that it is the owner of, or otherwise has the right to license, the intellectual property being licensed hereunder, including the designs, technology, copyright, patent, trade secret, trademark (in the U.S.), and any and all other rights licensed by AOT to FINELITE pursuant to this Agreement.

6. Patent Matters.

6.1 FINELITE shall have the sole right and discretion to file and prosecute patent applications that cover any patent, trade secret or other proprietary rights owned by FINELITE, including AOT Improvements. AOT shall have the sole right and discretion to file and prosecute patent applications based upon AOT's Proprietary Rights.

6.2 FINELITE shall act in good faith to inform AOT of possible infringement of AOT's Proprietary Rights of which FINELITE becomes aware. AOT shall act in good faith to inform FINELITE of possible infringement of AOT's Proprietary Rights of which AOT becomes aware.

6.3 AOT shall act in good faith to inform FINELITE of possible infringement of any proprietary rights in AOT Improvements ("Improvements Proprietary Rights") of which AOT becomes aware. FINELITE shall act in good faith to inform AOT of possible infringement of Improvements Proprietary Rights of which FINELITE becomes aware.

7. Indemnity.

7.1 FINELITE shall defend, indemnify and hold harmless AOT and its directors, officers, agents, employees and members from and against all claims, liabilities, suits, losses, damages and expenses, including costs and reasonable attorney's fees, ("Claims") relating to or resulting from: (i) the manufacture, use, sale, distribution or export of Units or other products of FINELITE (including Claims for personal injury, death, or property damage), or (ii) FINELITE's failure to pay or remit any taxes, duties, levies or charges. This indemnity shall be inapplicable if FINELITE is not notified promptly of the Claim and is prejudiced by the delay in notice. The indemnified parties shall have the right to exercise reasonable control over any litigation within the scope of this indemnity insofar as it concerns claims against them; that control shall include the right to select and retain counsel to represent them at the indemnified parties' expense. All indemnified parties shall cooperate to the extent necessary in the defense of any action under this Section 7.1. No Claim shall be settled by FINELITE without the written consent of the indemnified parties, which consent shall not be unreasonably withheld or delayed.

7.2 AOT shall defend, indemnify, and hold harmless FINELITE, its affiliates, and their respective directors, officers, agents, employees, and members from and against all Claims relating to or resulting from challenges or disputes over AOT's ownership of the intellectual property, including the designs, technology, copyright, patent, trade secret, trademark (in the U.S.), and any and all other rights, being licensed by AOT to FINELITE pursuant to this Agreement and as warranted in Section 5.2 herein. The indemnified parties shall have the right to exercise reasonable control over any litigation within the scope of this indemnity insofar as it concerns any claims against them; that control shall include the right to select and retain counsel to represent them at the indemnified parties' expense. All indemnified parties shall cooperate to the extent necessary in the defense of any action under this Section 7.2. No claim shall be settled by AOT without the written consent of the indemnified parties, which consent shall not be unreasonably withheld or delayed.

8. Confidentiality.

8.1 For the purpose of this Article 8, the term "Confidential Information" means any material or information relating to a party's (the "Disclosing Party's") research, development, trade secrets and business operations and affairs that the Disclosing Party treats as confidential, but not any material or information that the other party (the "Receiving Party") can show (i) is or becomes publicly known through no fault of the Receiving Party; (ii) is developed independently by the Receiving Party; (iii) is known by the Receiving Party when disclosed by the Disclosing Party if the Receiving Party does not then have a duty to maintain its confidentiality; or (iv) is rightfully obtained by the Receiving Party from a third party not obligated to preserve its confidentiality.

8.2 A Receiving Party shall not use the Disclosing Party's Confidential Information for any purpose other than in accordance with this Agreement and shall not disclose Confidential Information to any person other than its employees and its independent contractors subject to a nondisclosure obligation comparable in scope to this Article 8, which employees and independent contractors have a need to know such Confidential Information.

8.3 Notwithstanding Section 8.2, a Receiving Party may disclose Confidential Information to the extent required by a court or other governmental authority, provided that (i) the Receiving Party gives the Disclosing Party reasonable notice of the disclosure, (ii) the Receiving Party uses reasonable efforts to resist disclosing the Confidential Information, and (iii) the Receiving party cooperates with the Disclosing Party on request to obtain a protective order or otherwise limit the disclosure.

8.4 The parties acknowledge that either party's breach of Section 8.2 would cause the other party irreparable injury for which it would not have an adequate remedy at law. In the event of a breach, the nonbreaching party shall be entitled to injunctive relief in addition to any other remedies it may have at law or in equity.

9. Term and Termination.

9.1 This Agreement shall remain in effect for a period of twenty (20) years from the Commercialization Date, unless terminated earlier in accordance with the provisions of this Article 9 or Sections 3.5 or 4.1.

9.2 AOT shall have the right to terminate this Agreement, including the license granted in Section 2.1, if FINELITE materially breaches any of its obligations under this Agreement, including by failing to make any payment as and when required by this Agreement, and FINELITE fails to remedy the breach within 30 days after receiving notice of the breach from AOT.

9.3 FINELITE shall have the right to terminate this Agreement, including the license granted in Section 2.1, but excluding the license granted in Section 2.4, upon 30 days written notice. If FINELITE does so, it shall make all required payments per this Agreement through the Termination Date and submit all required reports in accordance with Article 3. Notwithstanding the foregoing, upon termination, FINELITE shall no longer be required to make the quarterly \$5,000 minimum royalty payment for any quarter not completed by the termination date.

9.4 Upon any termination of this Agreement, FINELITE shall have 90 days to complete the manufacture of Units that then are work in progress. Additionally, FINELITE may sell its inventory of Units and fulfill existing orders for Units, provided that FINELITE makes all required payments and submits all required reports in accordance with Article 3 until such time as all Units are sold or otherwise distributed.

9.5 Termination of this Agreement for any or no reason shall not relieve FINELITE of liability for payment of any royalty due for Units made, used or sold prior to and after the effective date of such termination.

9.6 The provisions of Articles 3 (Payments), 7 (Indemnity), 8 (Confidentiality), 10 (Notices) and 11 (Miscellaneous) and Sections 2.4, 9.4 and 9.5 shall remain in effect after the termination or expiration of this Agreement.

10. Notices.

10.1 All notices sent under this Agreement shall be in writing and (i) hand delivered; (ii) transmitted by legible telecopy, with a copy sent concurrently by certified mail, return receipt requested; or (iii) delivered by prepaid overnight courier. Such notices shall be deemed effective when received.

10.2 Notices shall be sent to the parties at the addresses set forth in the preamble hereof; to the attention of Mr. Jack Rains if to AOT, and to the attention of Mr. Terry Clark if to FINELITE, or to such other individuals or addresses as a party may specify by proper notice.

11. Miscellaneous.

11.1 EACH PARTY SHALL IN ANY EVENT BE LIABLE FOR THE ACTUAL AND DIRECT DAMAGES ARISING FROM ITS BREACH OF THIS AGREEMENT. HOWEVER, EXCEPT FOR A CLAIM OF INDEMNIFICATION PURSUANT TO ARTICLE 7, NEITHER PARTY SHALL BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES, REGARDLESS OF WHETHER SUCH PARTY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NEITHER PARTY SHALL BE LIABLE FOR ANY OTHER DAMAGES IN EXCESS OF THE AMOUNTS PAYABLE BY FINELITE TO AOT UNDER THIS AGREEMENT.

11.2 Neither party may, without prior written consent of the other party, use the name or any trademark of the other party in any advertising or publicity material, or make any form of representation or statement which would constitute an express or implied endorsement by the other party of any product, except for the trademark license to the CONSTRUCTIVE OCCLUSION trademark as contemplated herein.

11.3 Nothing in this Agreement shall be construed as creating a partnership, joint venture or agency relationship between the parties, or as authorizing either party to act as agent for the other.

11.4 This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Virginia, without regard to its conflict of laws principles.

11.5 The provisions of this Agreement are severable, and the unenforceability of any provision of this Agreement shall not affect the enforceability of the remainder of this Agreement. The parties acknowledge that it is their intention that if any provision of this Agreement is determined by a court to be unenforceable as drafted, that provision should be construed in a manner designed to effectuate the purpose of that provision to the greatest extent possible under applicable law.

11.6 The rights and remedies provided in this Agreement and all other rights and remedies available to either party at law or in equity are, to the extent permitted by law, cumulative and not exclusive of any other right or remedy now or hereafter available at law or in equity. Neither asserting a right nor employing a remedy shall preclude the concurrent assertion of any other right or employment of any other remedy, nor shall the failure to assert any right or remedy constitutes a waiver of that right or remedy.

11.7 FINELITE shall not assign any of its rights or obligations under this Agreement to any third party without the prior written consent of AOT, which shall not be withheld unreasonably.

11.8 Neither party shall be liable for a delay in performing or failure to perform, in whole or in part, the terms of this Agreement due to strike, labor disputes, act of war, civil commotion, act of public enemy, fire, flood, or act of God or other causes beyond the reasonable control of such party, provided, however, that such party makes a diligent effort to overcome such obstacle and that the delay is no longer than that caused by the force majeure condition. In the event such condition prevents a party from fulfilling its obligations under this Agreement for a period of three months or greater, the other party shall have the right to terminate this Agreement.

11.9 This Agreement shall be binding upon and inure to the benefit of the parties, their successors, permitted assigns and legal representatives.

11.10 All headings in this Agreement are included solely for convenient reference and shall not affect the meaning or interpretation of this Agreement.

11.11 This Agreement may be executed in counterparts, each of which shall be deemed to be original but all of which together shall constitute a single instrument.

11.12 The failure of either party to insist upon or enforce strict performance by the other party of any provision of this Agreement or to exercise any right under this Agreement will not be construed as a waiver or relinquishment to any extent of such party's right to assert or rely upon any such provision or right in that or any other instance; rather, the same will be and remain in full force and effect. No waiver of or amendment to any of the terms hereof subsequent to the execution hereof claimed to have been made by any representative of either party shall have any force or effect unless in a writing signed by duly authorized representatives of the parties.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed by their respective duly authorized officers:

ADVANCED OPTICAL
TECHNOLOGIES, L.L.C.

By: *J. C. Rainor, Jr.*
Name: *JACK C. RAINOR, JR.*
Title: *PRESIDENT*
Date: *8 June 2001*

FINELITE, INC.

By: *Terry Clark*
Name: *President*
Title: *Terry Clark*
Date: *6/15/01*

APPENDIX A

DESCRIPTION OF LOW PROFILE FLUORESCENT LIGHT FIXTURE

LTL**LUMINAIRE TESTING LABORATORY, INC.**

IES

SUSTAINING
MEMBER

905 Harrison Street · Allentown, PA 18103 · (610) 770-1044 · Fax (610) 770-8912 · www.LuminaireTesting.com

LTL NUMBER: 05627

DATE: 02-16-2001

PREPARED FOR: ADVANCED OPTICAL TECHNOLOGIES

CATALOG NUMBER: LINEAR FLUORESCENT UPLIGHT VERSION 3

LUMINAIRE: FORMED STEEL SUPPORT, WHITE INTERNAL REFLECTORS, TRANSLUCENT
WHITE ACRYLIC LOWER ENCLOSURE, FORMED SPECULAR ALUMINUM
REFLECTORS, OPEN TOP.

LAMP: ONE SYLVANIA FP54/841/HO RATED AT 4400 LUMENS.

BALLAST: ONE SYLVANIA QT1X54/120PHO

MOUNTING: PENDENT

LUMEN TO CANDELA RATIO USED = 9.18

TOTAL INPUT WATTS = 59.9 AT 120.0 VOLTS

THE 0 DEGREE PLANE IS PARALLEL WITH THE LAMPS.

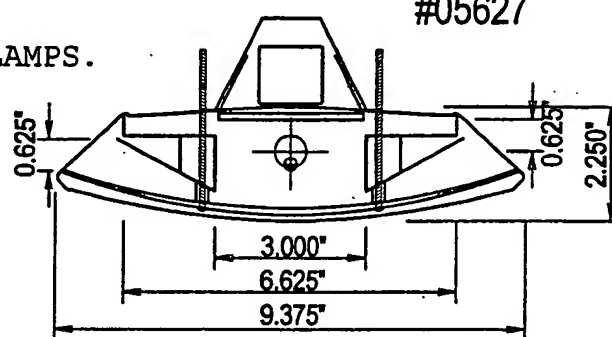
#05627

CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	233	233	233	233	233
5	234	233	233	231	232
15	217	218	218	217	218
25	199	198	198	197	198
35	174	172	174	172	171
45	145	145	145	145	146
55	110	112	113	114	114
65	79	78	79	78	80
75	38	39	41	43	42
85	9	12	17	17	16
90	2	18	19	19	19
95	19	396	368	323	313
105	52	356	1068	1393	1458
115	84	185	668	1271	1465
125	111	185	303	602	750
135	135	186	263	330	356
145	154	184	239	279	292
155	170	185	220	245	253
165	178	183	198	209	214
175	185	183	186	187	186
180	183	183	183	183	183

FLUX

22
62
91
108
113
102
76
44
16
360
931
702
347
199
146
100
56
18



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%LAMP	%FIXT
0- 30	175	4.0	5.0
0- 40	283	6.4	8.1
0- 60	497	11.3	14.2
0- 90	633	14.4	18.1
90-120	1993	45.3	57.1
90-130	2340	53.2	67.0
90-150	2686	61.0	76.9
90-180	2859	65.0	81.9
0-180	3493	79.4	100.0

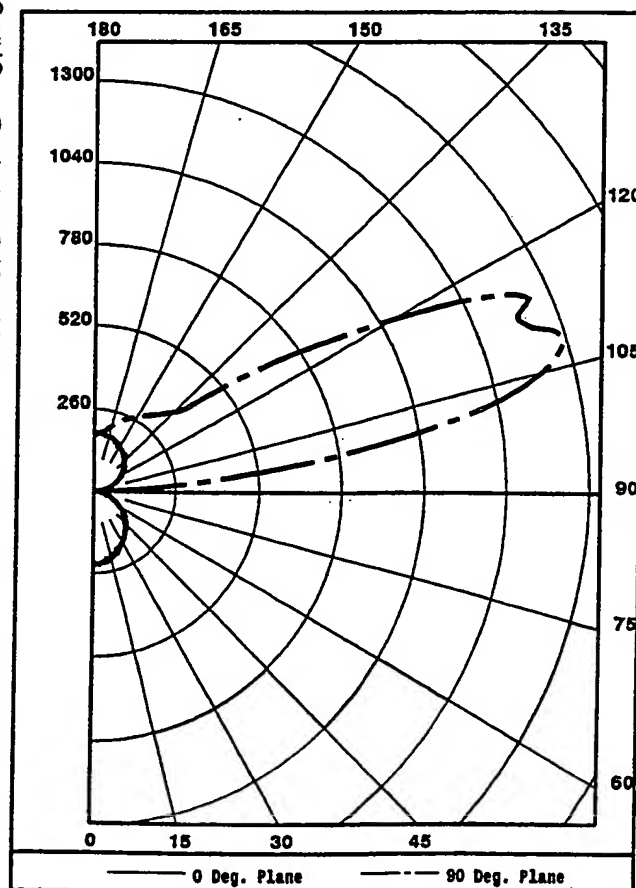
TOTAL LUMINAIRE EFFICIENCY:

CIE TYPE: SEMI-INDIRECT

PLANE: 0-DEG 90-DEG

SPACING CRITERIA: 1.2 1.2

79.4%



TESTED BY HERSCHEL SCHRECK

CHECKED BY MIKE GRATHER

THIS REPORT BASED ON ILM-11 AND OTHER PERTINENT IES PROCEDURES

LTL**LUMINAIRE TESTING LABORATORY, INC.****IES****SUSTAINING
MEMBER**905 Harrison Street · Allentown, PA 18103 · (610) 770-1044 · Fax (610) 770-8912 · www.LuminaireTesting.com

LTL NUMBER: 05627

DATE: 02-16-2001

PREPARED FOR: ADVANCED OPTICAL TECHNOLOGIES

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD
EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	79	79	79	79	70	70	70	70	52	52	52	36	36	36	21	21	21	14
1	72	69	66	63	63	61	58	56	46	44	43	32	31	30	19	18	18	12
2	66	60	55	52	58	53	49	46	40	37	35	28	26	25	17	16	15	10
3	60	53	47	43	52	47	42	38	35	32	30	25	23	21	15	14	13	9
4	55	47	41	36	48	41	36	32	31	28	25	22	20	18	13	12	11	8
5	50	41	35	31	44	37	31	28	28	24	21	19	17	15	12	11	10	6
6	46	37	31	26	40	33	27	24	25	21	18	17	15	13	11	9	8	6
7	42	33	27	23	37	29	24	21	22	19	16	16	13	12	10	8	7	5
8	39	30	24	20	34	26	21	18	20	16	14	14	12	10	9	7	6	4
9	36	27	21	17	32	24	19	16	18	15	12	13	10	9	8	6	6	4
10	33	24	19	15	29	22	17	14	17	13	11	12	9	8	7	6	5	3

PLANE: 0-DEG 90-DEG
 LUMINOUS LENGTH: 46.250 9.375
 HEIGHT OF SIDE: 2.250 2.250

LUMINANCE IN CANDELA PER SQUARE METER

ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
0	833.	833.	833.
45	716.	1069.	738.
55	663.	919.	710.
65	635.	742.	667.
75	481.	473.	415.
85	289.	264.	202.

LTL**LUMINAIRE TESTING LABORATORY, INC.****IES****SUSTAINING
MEMBER**905 Harrison Street · Allentown, PA 18103 · (610) 770-1044 · Fax (610) 770-8912 · www.LuminaireTesting.com

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CANDELA DISTRIBUTION

	0.0	22.5	45.0	67.5	90.0
0	233	233	233	233	233
5	234	233	233	231	232
10	226	225	226	225	225
15	217	218	218	217	218
20	207	209	209	207	208
25	199	198	198	197	198
30	184	185	185	184	185
35	174	172	174	172	171
40	160	160	160	160	159
45	145	145	145	145	146
50	129	129	129	130	131
55	110	112	113	114	114
60	93	95	95	94	95
65	79	78	79	78	80
70	58	58	60	61	61
75	38	39	41	43	42
80	24	25	26	27	26
85	9	12	17	17	16
90	2	18	19	19	19
95	19	396	368	323	313
100	34	530	960	1003	981
105	52	356	1068	1393	1458
110	70	207	992	1354	1500
115	84	185	668	1271	1465
120	98	181	433	889	1082
125	111	185	303	602	750
130	125	185	279	383	484
135	135	186	263	330	356
140	143	184	252	298	318
145	154	184	239	279	292
150	164	185	232	264	272
155	170	185	220	245	253
160	176	186	209	227	236
165	178	183	198	209	214
170	181	185	188	192	194
175	185	183	186	187	186
180	183	183	183	183	183

ZONAL LUMEN SUMMARY

0- 5	6.
5- 10	16.
10- 15	27.
15- 20	35.
20- 25	43.
25- 30	48.
30- 35	53.
35- 40	55.
40- 45	57.
45- 50	56.
50- 55	54.
55- 60	48.
60- 65	41.
65- 70	35.
70- 75	27.
75- 80	17.
80- 85	11.
85- 90	6.
90- 95	60.
95-100	300.
100-105	465.
105-110	467.
110-115	400.
115-120	302.
120-125	204.
125-130	143.
130-135	107.
135-140	92.
140-145	79.
145-150	67.
150-155	56.
155-160	44.
160-165	33.
165-170	23.
170-175	13.
175-180	4.

THIS TEST WAS CONDUCTED USING RELATIVE PHOTOMETRY TECHNIQUES ACCORDING TO STANDARD IESNA PROCEDURES. THE USER MUST THEREFORE USE CAUTION IN THE FOLLOWING SITUATIONS: 1) THIS TEST WAS PERFORMED USING A SPECIFIC BALLAST/LAMP COMBINATION. EXTRAPOLATION OF THESE DATA FOR OTHER BALLAST/LAMP COMBINATIONS MAY PRODUCE ERRONEOUS RESULTS. 2) ACCORDING TO IESNA PROCEDURES, THE BALLAST(S) AND LAMP(S) ARE PRESUMED TO PRODUCE 100% OF RATED OUTPUT. AN APPROPRIATE BALLAST FACTOR MUST BE APPLIED TO THE LUMEN OUTPUT RATINGS AND LUMINOUS INTENSITY VALUES GIVEN. 3) THIS TEST WAS CONDUCTED IN A CONTROLLED LABORATORY ENVIRONMENT WHERE THE AMBIENT TEMPERATURE WAS HELD AT 25°C ±1°C. FIELD PERFORMANCE MAY DIFFER PARTICULARLY IN REGARDS TO CHANGE IN LUMINOUS OUTPUT AS A RESULT OF DIFFERENCE IN AMBIENT TEMPERATURE AND METHOD OF MOUNTING THE LUMINAIRE.